

Notice No.2

Rules and Regulations for the Classification of Special Service Craft July 2016

The status of this Rule set is amended as shown and is now to be read in conjunction with this and prior Notices. Any corrigenda included in the Notice are effective immediately.

Issue date: December 2016

Amendments to	Effective date	Mandatory Instrument
Part 1, Chapter 2, Section 3	1 January 2017	
Part 1, Chapter 3, Sections 4, 5, 10, 11 & 12	1 January 2017	X
Part 1, Chapter 4, Sections 10 & 11	1 January 2017	X

Part 1, Chapter 2

Classification Regulations

■ Section 3

Character of classification and class notations

3.9 Class notations (machinery)

(Part only shown)

3.9.1 The following class notations are associated with machinery construction and arrangements, and may be assigned as considered appropriate by the Committee:

UMS This notation may be assigned when the control engineering equipment has been arranged, installed and tested in accordance with LR's Rules, or is equivalent thereto and the arrangements are such that the craft can be operated with the machinery spaces unattended.

CCS This notation may be assigned when the arrangements are such that the machinery may be operated with continuous supervision from a centralised control station. It denotes that the control engineering equipment has been arranged, installed and tested in accordance with LR's Rules, or is equivalent thereto.

3.9.2 The following class notations are associated with the machinery control and automation, and may be assigned as considered appropriate by the Classification Committee:

UMS This notation may be assigned when the arrangements are such that the unit can be operated with the machinery spaces unattended. It denotes that the control engineering equipment has been arranged, installed and tested in accordance with LR's Rules, or is equivalent thereto.

CCS This notation may be assigned when the arrangements are such that the machinery may be operated with continuous supervision from a centralised control station. It denotes that the control engineering equipment has been arranged, installed and tested in accordance with LR's Rules, or is equivalent thereto.

3.9.3 The following class notation is associated with vessels capable of being operated unmanned, and may be assigned as considered appropriate by the Classification Committee:

Unmanned Assigned when a vessel is designed and constructed such that it may be operated unmanned, i.e. without crew, passengers or other persons on board.

Existing paragraphs 3.9.2 and 3.9.3 have been renumbered 3.9.4 and 3.9.5.

3.12 Descriptive notes

3.12.5 **AL-SAFE** This ShipRight descriptive note (Cyber-enabled Design) will be assigned where specific aspects of the ship have been designed and maintained in accordance with the requirements of the LR document *ShipRight Procedure – autonomous ships*.

Part 1, Chapter 3

Periodical Survey Regulations for Service Craft

■ Section 4

Docking Surveys and In-water Surveys – Hull and machinery requirements

4.2 Docking Surveys

4.2.6 The sea connections, scuppers and sanitary discharges, and overboard discharge valves, their attachments to the hull and the gratings at the sea inlets are to be examined.

■ Section 5

Special Survey – General – Hull requirements

5.3 Examination and testing - General

5.3.11 Ship side valves (i.e. sea connections, scuppers and sanitary discharges) are to be tested once reassembled.

■ Section 11

Screwshafts, tube shafts, propellers and water jet units

11.1 Applicability

11.1.1 The requirements of this Section are applicable as follows:

- (a) to craft delivered on or after 1 January 2016; and
- (b) after the first screwshaft survey scheduled on or after 1 January 2016 for craft delivered before 1 January 2016.

11.1.2 For craft delivered before 1 January 2016, the first screwshaft survey held on or after 1 January 2016 is to be held in accordance with the requirements of *Pt 1, Ch 3, 12 Screwshafts, tube shafts, propellers and water jet units*.

11.2 Definitions

11.2.1 **Adequate means for protection against corrosion.** An adequate means for protection against corrosion is an approved means for full protection of the shaft against sea water intrusion and subsequent corrosion attack. Such means are used for the protection of common steel material against corrosion particularly in combination with water lubricated bearings. Typical means are to be for example:

- (a) continuous metallic, corrosion-resistant liners (*Pt 11, Ch 2, 4.14 Corrosion resistant liners on shafts*)
- (b) continuous cladding,
- (c) multiple layer synthetic coating,
- (d) multiple layers of fiberglass,
- (e) combinations of above mentioned,
- (f) rubber/elastomer covering coating.

The means for protection against corrosion are to be installed/applied according to LR approved procedures.

11.2.2 **Fresh Water sample test.** At the Screwshaft Survey, a sample of the fresh water in a closed loop fresh water lubricated shaft is to be taken in the presence of a Surveyor. The requirements for Fresh Water sample tests are given in the *ShipRight Procedure Machinery Planned Maintenance and Condition Monitoring*.

11.2.3 **Lubricating oil analysis.** Lubricating oil analysis is to be carried out at regular intervals not exceeding six months. The documentation on lubricating oil analysis is to be available on board. Oil samples, to be submitted for the analysis, should be taken under service conditions.

11.2.4 **Oil sample examination.** An oil sample examination is a visual examination of the stern tube lubricating oil taken in the presence of a Surveyor, with a focus on water contamination.

11.2.5 **Service records.** Service records are regularly recorded data showing in-service conditions of the shaft(s) and are to include:

- (a) For Oil Lubricated Stern Bearings: lubricating oil temperature, bearing temperature and oil consumption records.
- (b) For Closed Loop System Fresh Water Lubricated Bearings: water flow, water temperature, salinity, pH, make-up water and water pressure (depending on design).

11.2.6 **Survey Methods on Closed Systems.** Oil Lubricated Shafts or Closed Loop System Fresh Water Lubricated Shafts:

- (a) **TS Method 1** – Survey of screwshaft, tube shaft and propeller in accordance with the requirements of TS Method 1, see *Table 3.11.3 Shaft survey methods*. Primarily the shaft is withdrawn and the propeller is removed.
- (b) **TS Method 2** – Survey of screwshaft, tube shaft and propeller in accordance with the requirements of TS Method 2, see *Table 3.11.3 Shaft survey methods*. Primarily records are reviewed, the propeller is removed but the shaft is not withdrawn.
- (c) **TS Method 3** – Survey of screwshaft, tube shaft and propeller in accordance with the requirements of TS Method 3, see *Table 3.11.3 Shaft survey methods*. Primarily records are reviewed, the shaft is not withdrawn and the propeller is not removed.

11.2.7 **Survey Methods on Open Systems.** Water Lubricated Shafts:

- (a) **TS Method 4** – Survey of screwshaft, tube shaft and propeller in accordance with the requirements of TS Method 4, see *Table 3.11.3 Shaft survey methods*. Primarily the shaft is withdrawn and the propeller is removed.

11.2.8 **Tube shaft** is a shaft placed between the intermediate shaft and propeller shaft, normally arranged within a stern tube or running in open water. It may also be called a Stern Tube Shaft.

11.3 Closed Systems – Oil Lubricated Shafts or Closed Loop System Fresh Water Lubricated Shafts: Frequency of surveys

11.3.1 Oil lubricated shafts fitted with approved oil glands and closed loop system fresh water lubricated shafts fitted with approved adequate means of protection against corrosion or fabricated from corrosion-resistant material are to be surveyed in accordance with *Pt 1, Ch 3, 11.3 Closed Systems – Oil Lubricated Shafts or Closed Loop System Fresh Water Lubricated Shafts: Frequency of surveys 11.2.2 to Pt 1, Ch 3, 11.3 Closed Systems – Oil Lubricated Shafts or Closed Loop System Fresh Water Lubricated Shafts: Frequency of surveys 11.2.5*.

11.3.2 Shafts with a keyless propeller connection or a flanged propeller connection (including controllable pitch propellers for main propulsion purposes) are to be surveyed at intervals of five years in accordance with TS Method 1, 2 or 3.

11.3.3 Shafts with a keyed propeller connection with a keyway that complies fully with the present Rules are to be surveyed at intervals of five years in accordance with TS Method 1 or 2; TS Method 3 is not permitted.

11.3.4 For oil lubricated keyless shafts, the maximum interval between two surveys carried out according to TS Method 1 or TS Method 2 shall not exceed 15 years, except in the case when one extension for no more than three months is agreed.

11.3.5 Closed loop system fresh water lubricated shafts may be surveyed in accordance with TS Method 2 or for keyless shafts TS Method 3, only if the descriptive note **ShipRight SCM** is assigned. Notwithstanding this, the maximum interval between two surveys carried out according to TS Method 1 shall not exceed 15 years, except in the case when one extension for no more than three months is agreed.

11.3.6 Shaft configurations other than those listed in *Pt 1, Ch 3, 11.3 Closed systems – Oil Lubricated Shafts or Closed Loop System Fresh Water Lubricated Shafts: Frequency of surveys 11.2.1* to *Pt 1, Ch 3, 11.3 Closed systems – Oil Lubricated Shafts or Closed Loop System Fresh Water Lubricated Shafts: Frequency of surveys 11.2.5* above are to be surveyed at intervals of three years in accordance with TS Method 1.

11.3.7 TS Method 2 and TS Method 3 are only permitted where the prerequisite service records and data specified for those methods are to be provided. If at the time of survey the attending Surveyor is not satisfied with the service records and data presented, then the shaft may be required to be withdrawn. The service records and data are to be retained on board and audited by LR at the Annual Survey.

11.3.8 For oil lubricated arrangements, the descriptive note **ShipRight SCM** is not a prerequisite in order to hold TS Method 2 and TS Method 3.

11.3.9 In order to assign and maintain the descriptive note **ShipRight SCM**, the requirements of *Pt 11, Ch 2, 5.2 Screwshaft Condition Monitoring (SCM)* and *ShipRight Procedure Machinery Planned Maintenance and Condition Monitoring, Section 6* are to be complied with, including the requirements therein for onboard maintenance of records and review of them by the attending Surveyor at Annual Survey.

11.3.10 For surveys completed within three months before the shaft survey due date, the next period will start from the shaft survey due date.

11.3.11 See Summary of Survey Intervals and Extensions for closed systems in *Table 3.11.1 Summary of survey intervals and extensions - closed systems*

11.4 Open Systems – Water Lubricated Shafts: Frequency of surveys

11.4.1 Survey in accordance with TS Method 4 at intervals of five years is applicable to any of the following:

- (a) Single shaft operating in fresh water only;
- (b) Single shaft provided with approved adequate means of protection against corrosion or fabricated from corrosion-resistant material;
- (c) Multiple shaft arrangements.

11.4.2 Single shaft configurations other than listed above are to be surveyed every three years in accordance with TS Method 4.

11.4.3 For shafts subject to five-yearly surveys with keyless connections, at the Surveyor's discretion removal of the propeller and NDE of the shaft taper, as required by TS Method 4, need only be carried out every 15 years, subject to a satisfactory visual inspection of all accessible parts of the shafting system at the intervening surveys.

11.4.4 For surveys completed within three months before the shaft survey due date, the next survey period will start from the shaft survey due date.

11.4.5 At the discretion of the Classification Committee, consideration may be given to accept special arrangements to monitor the condition of the screwshaft, bearings, sealing devices and the stern tube lubricant system so as to allow an extension to the interval between withdrawals of the Screwshaft required by TS Method 4. This is subject to the shaft being provided with approved adequate means of protection against corrosion or being fabricated from corrosion-resistant material.

11.4.6 See Summary of Survey Intervals and Extensions for open systems in *Table 3.11.2 Summary of Survey Intervals and Extensions – open systems*.

11.5 Survey extensions

11.5.1 For all types of propeller connections, consideration can be given at the discretion of the Classification Committee to an extension of the interval between two consecutive surveys after the execution of an extension survey as follows:

- (a) Extension up to a maximum of two and a half years: Only permitted for closed systems. No more than one extension can be considered. No further extension, of other type, can be considered.

- (b) Extension up to a maximum of one year: Two consecutive 'one year extensions' can be considered. Where an additional extension is agreed the requirements of the 'two and a half year extension' are to be carried out and the shaft survey due date, prior to the previous extension(s), is extended for a maximum of two and a half years.
- (c) Extension up to a maximum of three months: One 'three month extension' can be considered. In the event an additional extension is agreed the requirements of the 'one year extension' or 'two and a half years extension' are to be carried out and the shaft survey due date, prior to the previous extension, is extended for a maximum of one year or two and a half years.

11.5.2 If the extension survey is carried out within one month of the shaft survey due date then the extension will take effect from the shaft survey due date.

11.5.3 If the extension survey is carried out more than one month prior to the shaft survey due date, then the period of extension will take effect from the date on which the extension survey was completed.

Table 3.11.1 Summary of Survey Intervals and Extensions – Closed systems

Oil Lubricated			
	Flanged Propeller Coupling	Keyless Propeller Coupling	Keyed Propeller Coupling (see Note b)
Every 5 years (see Note a)	TS Method 1 or TS Method 2 or TS Method 3	TS Method 1 or TS Method 2 or TS Method 3 (see Note c)	TS Method 1 or TS Method 2
Extension 2,5 years	Yes (see Note d)	Yes (see Note d)	Yes (see Note d)
Extension 1 year	Yes (see Note e)	Yes (see Note e)	Yes (see Note e)
Extension 3 months	Yes (see Note f)	Yes (see Note f)	Yes (see Note f)
Closed Loop System Fresh Water Lubricated			
	Flanged Propeller Coupling	Keyless Propeller Coupling	Keyed Propeller Coupling (see Note b)
Every 5 years ^a	TS Method 1 (see Note g) or TS Method 2 or TS Method 3	TS Method 1 (see Note g) or TS Method 2 or TS Method 3	TS Method 1 (see Note g) or TS Method 2
Extension 2,5 years	Yes (see Note d)	Yes (see Note d)	Yes (see Note d)
Extension 1 year	Yes (see Note e)	Yes (see Note e)	Yes (see Note e)
Extension 3 months	Yes (see Note f)	Yes (see Note f)	Yes (see Note f)
<p>General notes:</p> <p>For surveys (TS Method 1, or TS Method 2, or TS Method 3) completed within 3 months before the shaft survey due date, the next period will start from the shaft survey due date.</p> <p>If the extension survey is carried out within 1 month of the shaft survey due date then the extension will take effect from the shaft survey due date. If the extension survey is carried out more than 1 month prior to the shaft survey due date, then the period of extension counts from the date when the extension survey was completed.</p> <p>Notes:</p> <p>a. Unless an Extension (Extension 2,5 years, Extension 1 year, Extension 3 months) is applied in between.</p> <p>b. TS Method 3 not allowed.</p> <p>c. The maximum interval between two surveys carried out according to TS Method 1 or TS Method 2 shall not exceed 15 years, except in the case when one extension for no more than 3 months is agreed.</p> <p>d. No more than one extension can be considered. No further extension of other type can be considered.</p> <p>e. Two consecutive extensions can be considered. Where an additional extension is agreed the requirements of the '2,5 year extension' are to be carried out and the shaft survey due date, prior to the previous extension(s), is extended for a maximum of 2,5 years.</p> <p>f. Extension up to a maximum of 3 months: One '3 month extension' can be considered. In the event an additional extension is agreed the requirements of the '1 year extension' or '2,5 years extension' are to be carried out and the shaft survey due date, prior to the previous extension, is extended for a maximum of 1 year or 2,5 years.</p> <p>g. The maximum interval between two surveys carried out according to TS Method 1 shall not be more than 15 years, except in the case when one extension for no more than 3 months is agreed.</p>			

Table 3.11.2 Summary of Survey Intervals and Extensions – Open systems

<ul style="list-style-type: none"> Single shaft operating exclusively in fresh water. Single shaft provided with adequate means of corrosion protection, single corrosion resistant shaft. All kinds of multiple shaft arrangements. 		Other shaft configuration.	
	All kinds of Propeller Coupling (see Note d)		All kinds of Propeller Coupling (see Note d)
Every 5 years (see Note a)	TS Method 4	Every 3 years (see Note a)	TS Method 4
Extension 1 year	Yes (see Note b)	Extension 1 year	Yes (see Note b)
Extension 3 months	Yes (see Note c)	Extension 3 months	Yes (see Note c)
<p>General notes:</p> <p>For surveys (TS Method 4) completed within 3 months before the shaft survey due date, the next period will start from the shaft survey due date.</p> <p>If the extension survey is carried out within 1 month of the shaft survey due date then the extension will take effect from the shaft survey due date. If the extension survey is carried out more than 1 month prior to the shaft survey due date, then the period of extension counts from the date when the extension survey was completed.</p> <p>Notes:</p> <p>a. Unless an Extension (Extension 1 year, Extension 3 months) is applied in between.</p> <p>b. No more than one extension can be considered. No further extension, of other type, can be considered.</p> <p>c. One extension can be considered. In the event an additional extension is agreed the requirements of the one year extension are to be carried out and the shaft survey due date prior to the previous extension is extended for a maximum of one year.</p> <p>d. For keyless propeller connections the maximum interval between two consecutive dismantling and verifications of the shaft cone by means of non-destructive examination (NDE) shall not exceed 15 years.</p>			

11.6 Shaft Survey Methods

11.6.1 For the survey methods see Table 3.11.3 Shaft survey methods below.

Table 3.11.3 Shaft Survey Methods

	TS METHOD 1	TS METHOD 2	TS METHOD 3	TS METHOD 4
GENERAL				
Drawing the shaft and examining the entire shaft (including liners, corrosion protection system and stress reducing features, where provided), sealing system and bearings	X			X
SHAFT				
Visual examination of all accessible parts of the shafting system <i>in situ</i>		X	X	
For keyed and keyless propeller connections, removing the propeller to expose the forward end of the taper	X	X		X
For keyed and keyless propeller connections, perform a non-destructive examination (NDE) by an approved surface crack-detection method around the after end of the cylindrical part of the shaft and the forward one-third of the shaft cone, including the keyway with the key removed (if fitted); for shafts provided with liners the NDE shall be extended to the after edge of the liner	X	X		X
For flanged connections, whenever the coupling bolts of any type of flange-connected shaft are removed or the flange radius is made accessible in connection with overhaul, repairs or when deemed necessary by the Surveyor, the coupling bolts and flange radius are to be examined by means of an approved surface crack detection method	X	X	X	X
Visual examination of all accessible parts of the shafting system following re-installation of the shaft	X			X
PROPELLER				
Examination of the propeller	X	X	X	X
Controllable pitch propellers, where fitted, are to be opened up and the working parts examined, together with the control gear. Propeller to be examined upon reassembly	X	X		X
Where a controllable pitch propeller is fitted, at least one of the blades is to be dismantled completely for examination of the working parts and the control gear. Propeller to be examined upon reassembly			X	
Examination of the propeller following re-installation	X	X		X

BEARING CLEARANCES				
Checking, recording and verification of bearing clearances	X			X
Recording the bearing wear down measurements after re-installation, if applicable	X			
Checking and recording the bearing wear down measurements		X	X	
SEALING SYSTEM				
Examine the inboard and outboard seals with shaft removed and following the re-installation of the shaft and propeller	X			X
Examine the inboard and outboard seals		X	X	
Examination of seal liner		X	X	
OTHERS				
Stationary supporting structure and any erosion protection inserts or doublers are to be examined in way of any propulsion devices	X	X	X	X
Verification of no unapproved repairs by grinding or welding of shaft and/or propeller	X	X	X	X
SERVICE RECORDS				
Review of service records		X	X	
Review of test records of Lubricating Oil Analysis (for oil lubricated shafts), or Fresh Water Sample Test (for closed system fresh water lubricated shafts)		X	X	
Oil Sample Examination (for oil lubricated shafts), or Fresh Water Sample Test (for closed system fresh water lubricated).		X	X	

11.7 Other systems

11.7.1 Directional propeller and podded propulsion units for main propulsion purposes, inclusive of the propellers, shafts, gearing, control gear and the primary electrical components including any control and protection devices, are to be surveyed at intervals not exceeding five years. They are to be dismantled if considered necessary and generally examined as far as practicable. Non-destructive examination is to be carried out as considered necessary by the Surveyor on blade/fin roots. Consideration may be given to condition monitoring schemes for determining the condition of the unit.

11.7.2 Dynamic positioning and/or thruster-assisted mooring and athwartship thrust propellers and shaftings are to be surveyed at intervals not exceeding five years. They are to be generally examined so far as possible in dry dock and tested under working conditions afloat for satisfactory operation. All accessible parts, including sealing, locking and bearing faces, and any other moving parts are to be examined. Non-destructive examination is to be carried out as considered necessary by the Surveyor on blade/fin roots. Consideration may be given to condition monitoring schemes for determining the condition of the unit.

11.7.3 Water jet units for main propulsion purposes, including the impeller, casing, shaft, shaft seal, shaft bearing, inlet and outlet channels, steering nozzle, reversing arrangements, and control gear are to be surveyed at intervals not exceeding five years, provided the impeller shafts are made of approved corrosion-resistant material or have approved equivalent arrangements. They are to be generally examined so far as practicable.

11.7.4 Stationary supporting structure and any erosion protection inserts or doublers are to be examined in way of any propulsion devices.

11.8 Alternative arrangements

11.8.1 The Classification Committee will be prepared to give consideration to the circumstances of any special case upon application by the Owner, where the level of safety achieved is equivalent to that obtained by the survey methods described in this Section.

Existing Section 11 has been renumbered Section 12.

■ **Section ~~11~~ 12**
Screwshafts, tube shafts, propellers and water jet units

12.1 Applicability

12.1.1 The requirements of this Section are only applicable to the first screwshaft survey on or after 1 January 2016 for craft delivered before 1 January 2016. For subsequent screwshaft surveys, see *Pt 1, Ch 3, 11 Periodical Survey Regulations for Service Craft – Screwshafts, tube shafts, propellers and water jet units*.

12.1.2 For screwshaft survey requirements on craft delivered on or after 1 January 2016, see *Pt 1, Ch 3, 11 Periodical Survey Regulations for Service Craft – Screwshafts, tube shafts, propellers and water jet units*.

Existing sub-Sections 11.1 to 11.5 have been renumbered 12.2 to 12.6.

Existing Section 12 has been renumbered 13.

Part 1, Chapter 4

Periodical Survey Regulations for Yachts

■ Section 10

Screwshafts, tube shafts, propellers and water jet units

10.1 Applicability

10.1.1 The requirements of this Section are applicable as follows:

- (a) to craft delivered on or after 1 January 2016; and
- (b) after the first screwshaft survey scheduled on or after 1 January 2016 for craft delivered before 1 January 2016.

10.1.2 For yachts delivered before 1 January 2016, the first screwshaft survey held on or after 1 January 2016 is to be held in accordance with the requirements of *Pt 1, Ch 4, 11 Screwshafts, tube shafts, propellers and water jet units*.

10.2 Definitions

10.2.1 **Adequate means for protection against corrosion.** An adequate means for protection against corrosion is an approved means for full protection of the shaft against sea water intrusion and subsequent corrosion attack. Such means are used for the protection of common steel material against corrosion particularly in combination with water lubricated bearings. Typical means are to be for example:

- (a) continuous metallic, corrosion-resistant liners (*Pt 11, Ch 2, 4.14 Corrosion resistant liners on shafts*)
- (b) continuous cladding,
- (c) multiple layer synthetic coating,
- (d) multiple layers of fiberglass,
- (e) combinations of above mentioned,
- (f) rubber/elastomer covering coating.

The means for protection against corrosion are to be installed / applied according to LR approved procedures.

10.2.2 **Fresh Water sample test.** At the Screwshaft Survey, a sample of the fresh water in a closed loop fresh water lubricated shaft is to be taken in the presence of a Surveyor. The requirements for Fresh Water sample tests are given in the *ShipRight Procedure Machinery Planned Maintenance and Condition Monitoring*.

10.2.3 **Lubricating oil analysis.** Lubricating oil analysis is to be carried out at regular intervals not exceeding six months. The documentation on lubricating oil analysis is to be available on board. Oil samples, to be submitted for the analysis, should be taken under service conditions.

10.2.4 **Oil sample examination.** An oil sample examination is a visual examination of the stern tube lubricating oil taken in the presence of a Surveyor, with a focus on water contamination.

10.2.5 **Service records.** Service records are regularly recorded data showing in-service conditions of the shaft(s) and are to include:

- (a) For Oil Lubricated Stern Bearings: lubricating oil temperature, bearing temperature and oil consumption records.
- (b) For Closed Loop System Fresh Water Lubricated Bearings: water flow, water temperature, salinity, pH, make-up water and water pressure (depending on design).

10.2.6 **Survey Methods on Closed Systems.** Oil Lubricated Shafts or Closed Loop System Fresh Water Lubricated Shafts:

- (a) **TS Method 1** – Survey of screwshaft, tube shaft and propeller in accordance with the requirements of TS Method 1, see *Table 4.10.3 Shaft survey methods*. Primarily the shaft is withdrawn and the propeller is removed.
- (b) **TS Method 2** – Survey of screwshaft, tube shaft and propeller in accordance with the requirements of TS Method 2, see *Table 4.10.3 Shaft survey methods*. Primarily records are reviewed, the propeller is removed but the shaft is not withdrawn.
- (c) **TS Method 3** – Survey of screwshaft, tube shaft and propeller in accordance with the requirements of TS Method 3, see *Table 4.10.3 Shaft survey methods*. Primarily records are reviewed, the shaft is not withdrawn and the propeller is not removed.

10.2.7 **Survey Methods on Open Systems.** Water Lubricated Shafts:

- (a) **TS Method 4** – Survey of screwshaft, tube shaft and propeller in accordance with the requirements of TS Method 4, see *Table 4.10.3 Shaft survey methods*. Primarily the shaft is withdrawn and the propeller is removed.

10.2.8 **Tube shaft** is a shaft placed between the intermediate shaft and propeller shaft, normally arranged within a stern tube or running in open water. It may also be called a Stern Tube Shaft.

10.3 Closed Systems – Oil Lubricated Shafts or Closed Loop System Fresh Water Lubricated Shafts: Frequency of surveys

10.3.1 Oil lubricated shafts fitted with approved oil glands and closed loop system fresh water lubricated shafts fitted with approved adequate means of protection against corrosion or fabricated from corrosion resistant material are to be surveyed in accordance with *Pt 1, Ch 4, 10.3 Closed Systems – Oil Lubricated Shafts or Closed Loop System Fresh Water Lubricated Shafts: Frequency of surveys*

10.2.2 to Pt 1, Ch 4, 10.3 Closed Systems – Oil Lubricated Shafts or Closed Loop System Fresh Water Lubricated Shafts: Frequency of surveys 10.2.5.

10.3.2 Shafts with a keyless propeller connection or a flanged propeller connection (including controllable pitch propellers for main propulsion purposes) are to be surveyed at intervals of five years in accordance with TS Method 1, 2 or 3.

10.3.3 Shafts with a keyed propeller connection with a keyway that complies fully with the present Rules are to be surveyed at intervals of five years in accordance with TS Method 1 or 2; TS Method 3 is not permitted.

10.3.4 For oil lubricated keyless shafts, the maximum interval between two surveys carried out according to TS Method 1 or TS Method 2 shall not exceed 15 years, except in the case when one extension for no more than three months is agreed.

10.3.5 Closed loop system fresh water lubricated shafts may be surveyed in accordance with TS Method 2 or for keyless shafts TS Method 3, only if the descriptive note **ShipRight SCM** is assigned. Notwithstanding this, the maximum interval between two surveys carried out according to TS Method 1 shall not exceed 15 years, except in the case when one extension for no more than three months is agreed.

10.3.6 Shaft configurations other than those listed in Pt 1, Ch 4, 10.3 Closed systems – Oil lubricated shafts or closed loop system fresh water lubricated shafts: frequency of surveys 10.2.1 to Pt 1, Ch 4, 10.3 Closed systems – Oil lubricated shafts or closed loop system fresh water lubricated shafts: frequency of surveys 10.2.5 above are to be surveyed at intervals of three years in accordance with TS Method 1.

10.3.7 TS Method 2 and TS Method 3 are only permitted where the prerequisite service records and data specified for those methods are to be provided. If at the time of survey the attending Surveyor is not satisfied with the service records and data presented, then the shaft may be required to be withdrawn. The service records and data are to be retained on board and audited by LR at the Annual Survey.

10.3.8 For oil lubricated arrangements, the descriptive note **ShipRight SCM** is not a prerequisite in order to hold TS Method 2 and TS Method 3.

10.3.9 In order to assign and maintain the descriptive note **ShipRight SCM** the requirements of Pt 11, Ch 2, 5.2 Screwshaft Condition Monitoring (SCM) and ShipRight Procedure document Machinery Planned Maintenance and Condition Monitoring Section 6 are to be complied with, including the requirements therein for onboard maintenance of records and review of them by the attending Surveyor at Annual Survey.

10.3.10 For surveys completed within three months before the shaft survey due date, the next period will start from the shaft survey due date.

10.3.11 See Summary of Survey Intervals and Extensions for closed systems in Table 4.10.1 Summary of survey intervals and Extensions – closed systems.

10.4 Open systems – Water Lubricated Shafts: Frequency of surveys

10.4.1 Survey in accordance with TS Method 4 at intervals of five years is applicable to any of the following:

- (a) Single shaft operating in fresh water only;
- (b) Single shaft provided with approved adequate means of protection against corrosion or fabricated from corrosion-resistant material;
- (c) Multiple shaft arrangements.

10.4.2 Single shaft configurations other than listed above are to be surveyed every three years in accordance with TS Method 4.

10.4.3 For shafts subject to five-yearly surveys with keyless connections, at the Surveyor's discretion removal of the propeller and NDE of the shaft taper, as required by TS Method 4, need only be carried out every 15 years, subject to a satisfactory visual inspection of all accessible parts of the shafting system at the intervening surveys.

10.4.4 For surveys completed within three months before the shaft survey due date, the next survey period will start from the shaft survey due date.

10.4.5 At the discretion of the Classification Committee, consideration may be given to accept special arrangements to monitor the condition of the screwshaft, bearings, sealing devices and the stern tube lubricant system so as to allow an extension to the interval between withdrawals of the Screwshaft required by TS Method 4. This is subject to the shaft being provided with approved adequate means of protection against corrosion or being fabricated from corrosion resistant material.

10.4.6 See Summary of Survey Intervals and Extensions for open systems in Table 4.10.2 Summary of survey intervals and extensions – Open systems.

10.5 Survey extensions

10.5.1 For all types of propeller connections, consideration can be given at the discretion of the Classification Committee to an extension of the interval between two consecutive surveys after the execution of an extension survey as follows:

- Extension up to a maximum of 2,5 years: Only permitted for closed systems. No more than one extension can be considered. No further extension, of other type, can be considered.
- Extension up to a maximum of one year: Two consecutive 'one year extensions' can be considered. Where an additional extension is agreed the requirements of the '2,5 year extension' are to be carried out and the shaft survey due date, prior to the previous extension(s), is extended for a maximum of 2,5 years.
- Extension up to a maximum of three months: One 'three month extension' can be considered. In the event an additional extension is agreed the requirements of the "one year extension" or '2,5 years extension' are to be carried out and the shaft survey due date, prior to the previous extension, is extended for a maximum of one year or 2,5 years.

10.5.2 If the extension survey is carried out within one month of the shaft survey due date then the extension will take effect from the shaft survey due date.

10.5.3 If the extension survey is carried out more than one month prior to the shaft survey due date, then the period of extension will take effect from the date on which the extension survey was completed.

Table 4.10.1 Summary of Survey Intervals and Extensions – Closed systems

Oil Lubricated			
	Flanged Propeller Coupling	Keyless Propeller Coupling	Keyed Propeller Coupling (see Note b)
Every 5 years (see Note a)	TS Method 1 or TS Method 2 or TS Method 3	TS Method 1 or TS Method 2 or TS Method 3 (see Note c)	TS Method 1 or TS Method 2
Extension 2,5 years	Yes (see Note d)	Yes (see Note d)	Yes (see Note d)
Extension 1 year	Yes (see Note e)	Yes (see Note e)	Yes (see Note e)
Extension 3 months	Yes (see Note f)	Yes (see Note f)	Yes (see Note f)
Closed Loop System Fresh Water Lubricated			
	Flanged Propeller Coupling	Keyless Propeller Coupling	Keyed Propeller Coupling (see Note b)
Every 5 years (see Note a)	TS Method 1 (see Note g) or TS Method 2 or TS Method 3	TS Method 1 (see Note g) or TS Method 2 or TS Method 3	TS Method 1 (see Note g) or TS Method 2
Extension 2,5 years	Yes (see Note d)	Yes (see Note d)	Yes (see Note d)
Extension 1 year	Yes (see Note e)	Yes (see Note e)	Yes (see Note e)
Extension 3 months	Yes (see Note f)	Yes (see Note f)	Yes (see Note f)
<p>General notes:</p> <p>For surveys (TS Method 1, or TS Method 2, or TS Method 3) completed within 3 months before the shaft survey due date, the next period will start from the shaft survey due date.</p> <p>If the extension survey is carried out within 1 month of the shaft survey due date then the extension will take effect from the shaft survey due date. If the extension survey is carried out more than 1 month prior to the shaft survey due date, then the period of extension counts from the date when the extension survey was completed.</p> <p>Notes:</p> <ol style="list-style-type: none"> Unless an Extension (Extension 2,5 years, Extension one year, Extension 3 months) is applied in between. TS Method 3 not allowed. The maximum interval between two surveys carried out according to TS Method 1 or TS Method 2 shall not exceed 15 years, except in the case when one extension for no more than three months is agreed. No more than one extension can be considered. No further extension of other type can be considered. Two consecutive extensions can be considered. Where an additional extension is agreed the requirements of the '2,5 year extension' are to be carried out and the shaft survey due date, prior to the previous extension(s), is extended for a maximum of 2,5 years. Extension up to a maximum of 3 months: One '3 month extension' can be considered. In the event an additional extension is agreed the requirements of the '1 year extension' or '2,5 years extension' are to be carried out and the shaft survey due date, prior to the previous extension, is extended for a maximum of 1 year or 2,5 years. The maximum interval between two surveys carried out according to TS Method 1 shall not be more than 15 years, except in the case when one extension for no more than 3 months is agreed. 			

Table 4.10.2 Summary of Survey Intervals and Extensions – Open systems

<ul style="list-style-type: none"> Single shaft operating exclusively in fresh water. Single shaft provided with adequate means of corrosion protection, single corrosion-resistant shaft. All kinds of multiple shaft arrangements. 		Other shaft configuration.	
	All kinds of Propeller Coupling (see Note d)		All kinds of Propeller Coupling (see Note d)
Every 5 years (see Note a)	TS Method 4	Every 3 years (see Note a)	TS Method 4
Extension 1 year	Yes (see Note b)	Extension 1 year	Yes (see Note b)
Extension 3 months	Yes (see Note c)	Extension 3 months	Yes (see Note c)
<p>General notes:</p> <p>For surveys (TS Method 4) completed within 3 months before the shaft survey due date, the next period will start from the shaft survey due date.</p> <p>If the extension survey is carried out within 1 month of the shaft survey due date then the extension will take effect from the shaft survey due date. If the extension survey is carried out more than 1 month prior to the shaft survey due date, then the period of extension counts from the date when the extension survey was completed.</p> <p>Notes:</p> <p>a. Unless an Extension (Extension 1 year, Extension 3 months) is applied in between.</p> <p>b. No more than one extension can be considered. No further extension, of other type, can be considered.</p> <p>c. One extension can be considered. In the event an additional extension is agreed the requirements of the 1 year extension are to be carried out and the shaft survey due date prior to the previous extension is extended for a maximum of one year.</p> <p>d. For keyless propeller connections the maximum interval between two consecutive dismantling and verifications of the shaft cone by means of non-destructive examination (NDE) shall not exceed 15 years.</p>			

10.6 Shaft Survey Methods

10.6.1 For the survey methods see Table 4.10.3 Shaft survey methods below.

Table 4.10.3 Shaft Survey Methods

	TS METHOD 1	TS METHOD 2	TS METHOD 3	TS METHOD 4
GENERAL				
Drawing the shaft and examining the entire shaft (including liners, corrosion protection system and stress reducing features, where provided), sealing system and bearings	X			X
SHAFT				
Visual examination of all accessible parts of the shafting system <i>in situ</i>		X	X	
For keyed and keyless propeller connections, removing the propeller to expose the forward end of the taper	X	X		X
For keyed and keyless propeller connections, perform a non-destructive examination (NDE) by an approved surface crack-detection method around the after end of the cylindrical part of the shaft and the forward one-third of the shaft cone, including the keyway with the key removed (if fitted); for shafts provided with liners the NDE shall be extended to the after edge of the liner	X	X		X
For flanged connections, whenever the coupling bolts of any type of flange-connected shaft are removed or the flange radius is made accessible in connection with overhaul, repairs or when deemed necessary by the Surveyor, the coupling bolts and flange radius are to be examined by means of an approved surface crack detection method	X	X	X	X
Visual examination of all accessible parts of the shafting system following re-installation of the shaft	X			X
PROPELLER				
Examination of the propeller	X	X	X	X
Controllable pitch propellers, where fitted, are to be opened up and the working parts examined, together with the control gear. Propeller to be examined upon reassembly	X	X		X
Where a controllable pitch propeller is fitted, at least one of the blades is to be dismantled completely for examination of the working parts and the control gear. Propeller to be examined upon reassembly			X	
Examination of the propeller following re-installation	X	X		X

BEARING CLEARANCES				
Checking, recording and verification of bearing clearances	X			X
Recording the bearing wear down measurements after re-installation, if applicable	X			
Checking and recording the bearing wear down measurements		X	X	
SEALING SYSTEM				
Examine the inboard and outboard seals with shaft removed and following the re-installation of the shaft and propeller	X			X
Examine the inboard and outboard seals		X	X	
Examination of seal liner		X	X	
OTHERS				
Stationary supporting structure and any erosion protection inserts or doublers are to be examined in way of any propulsion devices	X	X	X	X
Verification of no unapproved repairs by grinding or welding of shaft and/or propeller	X	X	X	X
SERVICE RECORDS				
Review of service records		X	X	
Review of test records of Lubricating Oil Analysis (for oil lubricated shafts), or Fresh Water Sample Test (for closed system fresh water lubricated shafts)		X	X	
Oil Sample Examination (for oil lubricated shafts), or Fresh Water Sample Test (for closed system fresh water lubricated).		X	X	

10.7 Other systems

10.7.1 Directional propeller and podded propulsion units for main propulsion purposes, inclusive of the propellers, shafts, gearing, control gear and the primary electrical components including any control and protection devices, are to be surveyed at intervals not exceeding five years. They are to be dismantled if considered necessary and generally examined as far as practicable. Non-destructive examination is to be carried out as considered necessary by the Surveyor on blade/fin roots. Consideration may be given to condition monitoring schemes for determining the condition of the unit.

10.7.2 Dynamic positioning and/or thruster-assisted mooring and athwartship thrust propellers and shaftings are to be surveyed at intervals not exceeding five years. They are to be generally examined so far as possible in dry dock and tested under working conditions afloat for satisfactory operation. All accessible parts, including sealing, locking and bearing faces, and any other moving parts are to be examined. Non-destructive examination is to be carried out as considered necessary by the Surveyor on blade/fin roots. Consideration may be given to condition monitoring schemes for determining the condition of the unit.

10.7.3 Water jet units for main propulsion purposes, including the impeller, casing, shaft, shaft seal, shaft bearing, inlet and outlet channels, steering nozzle, reversing arrangements, and control gear are to be surveyed at intervals not exceeding five years, provided the impeller shafts are made of approved corrosion-resistant material or have approved equivalent arrangements. They are to be generally examined so far as practicable.

10.7.4 Stationary supporting structure and any erosion protection inserts or doublers are to be examined in way of any propulsion devices.

10.8 Alternative arrangements

10.8.1 The Classification Committee will be prepared to give consideration to the circumstances of any special case upon application by the Owner, where the level of safety achieved is equivalent to that obtained by the survey methods described in this Section.

Existing Section 10 has been renumbered as Section 11.

■ **Section ~~10~~ 11**
Screwshafts, tube shafts, propellers and water jet units

11.1 Applicability

11.1.1 The requirements of this Section are only applicable to the first screwshaft survey on or after 1 January 2016 for yachts delivered before 1 January 2016. For subsequent screwshaft surveys, see *Pt 1, Ch 4, 10 Periodical Survey Regulations for Service Craft – Screwshafts, tube shafts, propellers and water jet units*.

11.1.2 For screwshaft survey requirements on yachts delivered on or after 1 January 2016, see *Pt 1, Ch 4, 10 Periodical Survey Regulations for Service Craft – Screwshafts, tube shafts, propellers and water jet units*.

Existing sub-Sections 10.1 to 10.5 have been renumbered 11.2 to 11.6.

Existing Sections 11 and 12 have been renumbered 12 and 13.

© Lloyd's Register Group Limited 2016
Published by Lloyd's Register Group Limited
Registered office (Reg. no. 08126909)
71 Fenchurch Street, London, EC3M 4BS
United Kingdom

Lloyd's Register is a trading name of Lloyd's Register Group Limited and its subsidiaries. For further details please see <http://www.lr.org/entities>

Lloyd's Register Group Limited, its subsidiaries and affiliates and their respective officers, employees or agents are, individually and collectively, referred to in this clause as 'Lloyd's Register'. Lloyd's Register assumes no responsibility and shall not be liable to any person for any loss, damage or expense caused by reliance on the information or advice in this document or howsoever provided, unless that person has signed a contract with the relevant Lloyd's Register entity for the provision of this information or advice and in that case any responsibility or liability is exclusively on the terms and conditions set out in that contract.